EOS Mission Support Network Performance Report

This is a monthly summary of EMSnet performance testing -- comparing the performance against the requirements.

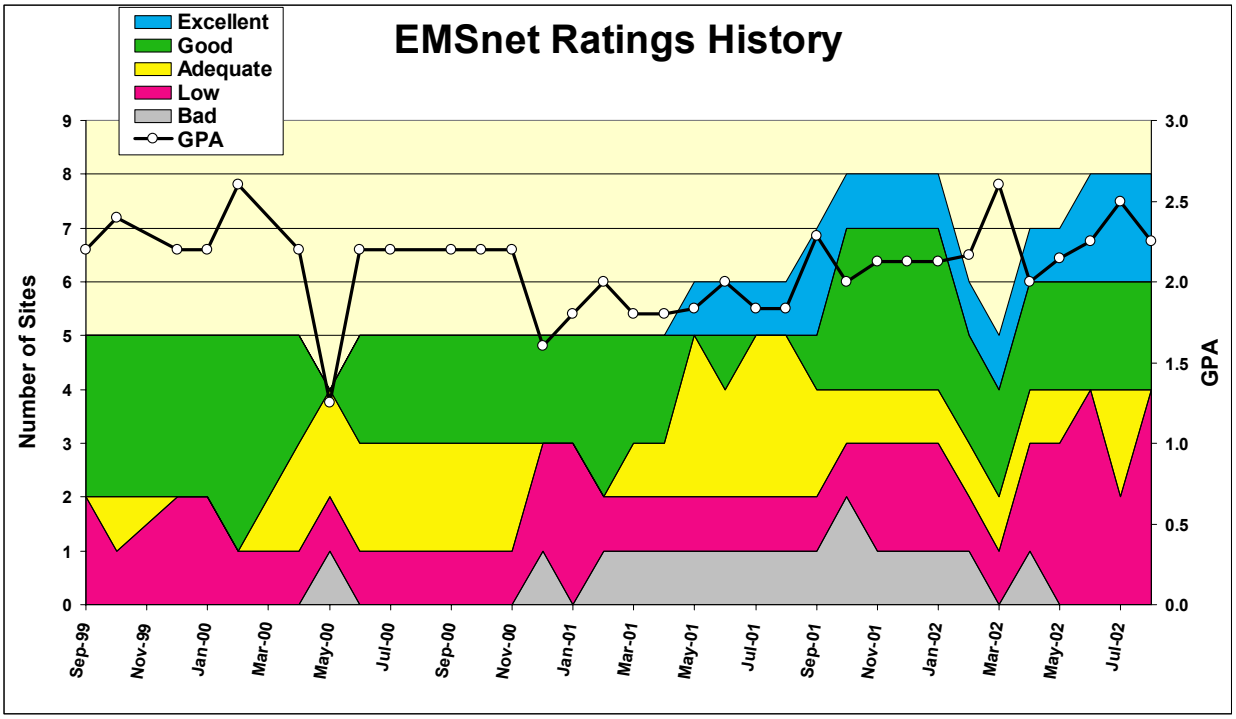
All results are reported on the web site:
http://corn.eos.nasa.gov/performance/Net_Health/EMSnet_list.html.
It shows MRTG-like graphs of the performance to various test sites, including thruput, RTT, packet loss, and hops, with 1 week, 2 month and 6 month graphs.

Highlights:

- All requirements are now at FY '03 levels
  - No "future" requirements shown
    - Will try to incorporate FY '04 requirements soon.
  - Increased requirement dropped EDC rating although performance was stable
- Backbone switched to BOP on Aug 15
  - Low speed PVCs improved
    - e.g., GSFC, LaRC to JPL: 3 mbps → 6 mbps
  - But GSFC → NSIDC dropped a bit
- ECS Firewalls do seem to impact performance
- Switchover to new NASDA circuit in August
  - Small performance drop
  - NASDA → US rating dropped to Low
  - Working with NASDA to use multiple TCP streams to overcome window size limitations in their test node.
- All other continuing tests had stable performance.

Ratings:

The chart below shows the number of sites in each classification since EMSnet testing started in September 1999. Note that these ratings do NOT relate to absolute performance -- they are relative to the EOS requirements. The GPA is calculated based on Excellent: 4, Good: 3, Adequate: 2, Low: 1, Bad: 0



Rating Categories:

Excellent: **Total Kbps** > Requirement * 3
Good: 1.3 * Requirement <= **Total Kbps** < Requirement * 3
Adequate: Requirement < **Total Kbps** < Requirement * 1.3
Low: **Total Kbps** < Requirement.
Bad: **Total Kbps** < Requirement / 3

Where Total Kbps = MRTG + iperf monthly average

Ratings Changes:

Upgrades: ↑: None

Downgrades: ↓:

EDC: Adequate → Low
NASDA → US: Adequate → Low

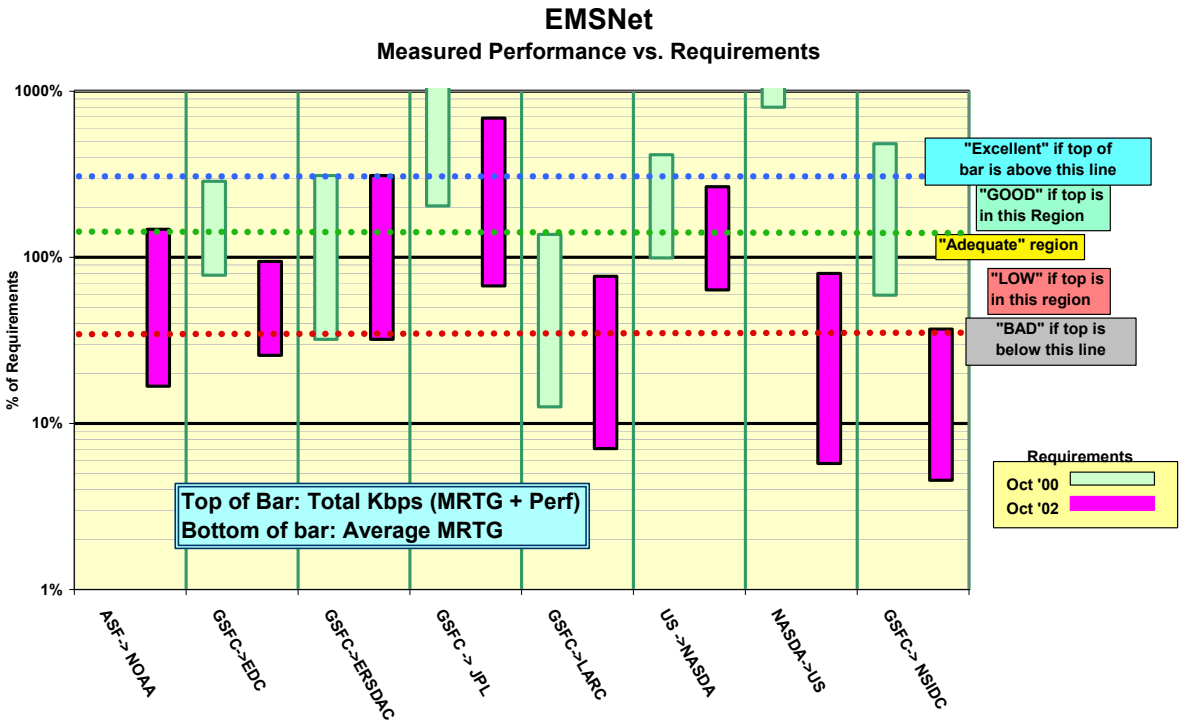
EMSnet Sites:
Network Requirements vs. Measured Performance

August 2002		Requirements (kbps)		Testing					
Source -> Destination	Team (s)	Previous (Oct '00)	Current (FY '03)	Source Node : Test Period	MRTG Avg kbps	Perf Avg kbps	Total Avg kbps	Current Status re FY '03*	Prev Stat
ASF-> NOAA	ADEOS II	0	1864	ASF->NESDIS: 01-Apr-02 - 31-Aug-02	312	2440	2752	GOOD	G
GSFC->EDC	MODIS, LandSat	82380	250335	DOORS-EDCTest: 19-Aug-02 - 31-Aug-02	64290	172393	236683	LOW	A
GSFC->ERSDAC	ASTER	275	275	GDAAC: 04-Jun-02 - 31-Aug-02	88	765	853	Excellent	E
GSFC -> JPL	QuikScat, TES, MLS, et	299	906	CSAFS: 15-Aug-02 - 31-Aug-02	609	5628	6237	Excellent	E
GSFC->LARC	CERES, MISR, MOPITT	63036	112800	GDAAC: 04-Jul-02 - 31-Aug-02	7943	78761	86704	LOW	L
US ->NASDA	QuikScat, TRMM, AMSI	555	863	CSAFS: 23-Aug-02 - 31-Aug-02	550	1749	2299	GOOD	G
NASDA->US	AMSR	0.2	1574	NASDA-EOC: 23-Aug-02 - 31-Aug-02	90	1168	1258	LOW	A
GSFC-> NSIDC	MODIS	8281	108166	GDAAC: 16-Aug-02 - 31-Aug-02	4902	35119	40021	LOW	L

Notes:	All flow requirements listed are the greater of inflow or outflow			**Ratings**		
	Flow Requirements (from BAH) include TRMM, Terra , Aqua, QuikScat, ADEOS II			**Summary**	vs FY '03	
					Score	**Prev**
***Criteria:**	**Excellent**	**Total Kbps** > Requirement * 3		**Excellent**	2	2
	GOOD	1.3 * Requirement <= **Total Kbps** < Requirement * 3		**GOOD**	2	2
	Adequate	Requirement < **Total Kbps** < Requirement * 1.3		**Adequate**	0	2
	LOW	**Total Kbps** < Requirement		**LOW**	4	2
	BAD	**Total Kbps** < Requirement / 3		**BAD**	0	0
	Change History:	27-Sep-99	Original - TRMM, Terra, and QuikScat	**Total**	8	8
		19-Jan-01	Incorporated BAH requirements including additional missions			
		9-Apr-01	Updated BAH requirements	**GPA**	2.25	2.50
		4-Jun-01	Added 50% contingency to BAH requirements			
		16-Nov-01	Added MRTG to Iperf, updated requirements, Revised criteria			

Comparison of measured performance with Requirements:

This graph shows three bars for each destination. Each bar uses the same actual measured performance, but compares it to the requirements for two different times (Oct '00, and Aug. '02). Thus as the requirements increase, the same measured performance will be a bit lower in comparison.



Note that the interpretation of these bars has changed from Sept '01. The bottom of each bar is the average measured MRTG flow to that site (previously daily minimum). Thus the bottom of each bar can be used to assess the relationship between the requirements and actual flows. Note that the requirements include a 50% contingency factor above what was specified by the projects, so a value of 66% would indicate that the project is flowing as much data as requested.

Details on individual sites:

1) ASF → CONUS: Rating: Continued Good

Test Results:

Source → Dest	Medians of daily tests (kbps)				
	Best	Median	Worst	MRTG	TOTAL
ASF → NESDIS	2698	2440	755	290	2969
ASF → GSFC-CSAFS	2702	2385	838		

Requirements:

Source → Dest	FY	mbps	Rating
ASF → NESDIS	'02, '03	1.86	Good

Comments: ASF host stabilized again June 6 (had been down since May 21). Also NESDIS host datasink restarted 5 June (had stopped 2 May). The 2.9 mbps total is about as expected for a 2 * T1 (3.1 mbps) circuit with competing flows. Since this is more than 30% over the April '02 requirement, the rating is "Good"

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2) GSFC → EDC: Rating: ↓ Adequate → Low

Test Results:

Source → Dest	Medians of daily tests (mbps)				
	Best	Median	Worst	MRTG	TOTAL
DOORS → EDC Test	228.2	172.4	74.3	64.3	236.7
DOORS → EDC DAAC	199.8	133.4	63.9		
G-DAAC→ EDC DAAC	156.3	85.8	38.8		

Requirements:

Date	mbps	Rating
Aug '02	250	Low

The three test cases above show the effects of the DAAC firewalls: the top test has no firewalls in the path, just vBNS+. The next test goes through the EDC firewall, and the last test goes through both the GSFC and EDC firewalls. The firewalls thus do appear to have a significant impact on performance – at least at these high rates.

The combined MRTG + thruput testing is close to, but somewhat below the requirement. While the performance is very similar to last month's, note that the BAH August requirement is now up to the FY '03 starting value, higher than last month. So these results would have been rated adequate compared to last month's requirement. It is indeed a challenge to get over 200 mbps into or out of a single host.

3) GSFC → ERSDAC: Rating: Continued **Excellent**

GSFC → ERSDAC Test Results:

Test Period	Medians of daily tests (kbps)				
	Best	Median	Worst	MRTG	TOTAL
4-Jun-02 – 31-Aug-02	795	765	487	88	853

Performance using the new 1 mbps ATM connection is very stable.

Requirements:

Source → Dest	FY	kbps	Rating
GSFC → ERSDAC	'02, '03	275	**Excellent**

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4) JPL: Rating: Continued **Excellent**

Test Results:

Source → Dest	Medians of daily tests (mbps)				
	Best	Median	Worst	MRTG	TOTAL
GSFC-CSAFS → JPL-SEAPAC	6.1	5.6	3.7	0.6	6.2
LaRC DAAC → JPL-TES	6.1	6.0	4.5		
GSFC DAAC → JPL-TES	21.1	11.6	3.8		
GSFC-MTVS1 → JPL-PODAAC	5.9	5.7	4.5		
NASDA-EOC→ JPL-SEAPAC	2.4	2.1	1.2		
ASF→ JPL-SEAPAC	2.8	2.6	1.3		

Requirements:

Source → Dest	Date	mbps	Rating
GSFC-CSAFS → JPL-SEAPAC	Aug '02	0.9	**Excellent**
LaRC DAAC → JPL-TES	Oct '02	2.05	**Excellent**

The rating is based on testing from CSAFS at GSFC to SEAPAC at JPL. Note that the MRTG flows to JPL include flows from all GSFC and LaRC sources, and also include flows destined to NASDA and ASF. Performance improved on 15 August (was typ. 3.9 mbps), due to BOP switchover. The measured performance rates as "Excellent" compared with the ICESAT requirement of 906 kbps.

Performance from LDAAC to JPL-TES also improved from 2.9 to 6.0 mbps on Aug 15 due to BOP.

The route from GDAAC to JPL-TES is still NISN SIP (since May 8). Performance improved substantially as a result. However, this is only a temporary route for this flow -- the intended route is via EMSnet, which should be installed after the GSFC LAN upgrade is complete.

Testing from GSFC-DAAC to JPL-PODAAC is also currently routed via NISN SIP, so EMSnet testing is performed from MTVS1. On 15 August, Performance improved due to BOP, from 3.3 mbps median (somewhat noisy) to 5.7 mbps steady.

NASDA → JPL-SEAPAC testing restarted 23 August on the new circuit, which was installed in August. Thruput is stable at 2.1 mbps typical thruput, but the testing has been failing since 30 August, possibly Due to a firewall blocking the test – under investigation.

ASF → JPL-SEAPAC testing resumed July 9, after firewall blocking at ASF was corrected. Thruput was steady at about 2.6 mbps, using the 2 T1s.

5) GSFC → LaRC: Rating: Continued Low

Test Results:

Test Period	Medians of daily tests (mbps)				
	Best	Median	Worst	MRTG	TOTAL
04-July-02 – 31-Aug-02	98.5	78.8	43.6	7.9	86.7
28-May-02 – 13-June-02	51.8	49.6	41.3		

Requirements:

Date	mbps	Rating
Oct '02	113	Low

Testing to LaRC resumed on 3 July, when the LaRC ECS firewall was configured to allow testing. It had been stopped June 13, for installation of the firewall, during which time the NISN circuit had been upgraded. In August the circuit was switched to BOP.

Performance in this configuration is much improved from the old one, which had a median of only about 50 mbps. But there is now a limit a bit above 100 mbps, even using multiple TCP streams, possibly due in part to the two firewalls in the path. This makes it impossible to achieve the 113 mbps requirement – but the performance is very close. The rating continues "Low".

6A) US (GSFC) → NASDA: Rating: Continued Good

Test Results:

Source → Dest	Medians of daily tests (kbps)				
	Best	Median	Worst	MRTG	TOTAL
GSFC-CSAFS → NASDA-EOC	2140	1749	488	550	2299

Requirements:

Source → Dest	FY	kbps	Rating
GSFC → NASDA	'02, '03	863	Good

Testing was down most of August for switchover to new circuit; resumed 23 August. Performance about the same as the old circuit (perhaps a bit lower), about as expected for a 3 mbps ATM PVC. Rating is still "Good".

6B) NASDA → US (GSFC):

Rating: Adequate ↓ → Low

Test Results:

Source → Dest	Medians of daily tests (kbps)				
	Best	Median	Worst	MRTG	TOTAL
NASDA-EOC → GSFC-CSAFS	1432	11168	356	50	1562

Requirements:

Source → Dest	FY	kbps	Rating
NASDA → GSFC	'02, '03	1574	Low

Performance dropped a bit with the switchover to the new circuit – median had been 1.5 mbps previously, and remains below the requirement. Performance is still limited by the NASDA machine window size. NASDA has installed updated scripts, and should be able to use multiple TCP streams soon.

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7) NSIDC:

Rating: Continued Low

GSFC → NSIDC Test Results:

Test Period	Medians of daily tests (mbps)				
	Best	Median	Worst	MRTG	TOTAL
16-Aug-02 – 31-Aug-02	42.8	35.1	26.7	4.9	40.0
3-May-02 – 30-June-02	48.8	37.4	25.7	4.0	41.5

Requirements:

Date	mbps	Rating
Oct '02	108	Low

Testing to NSIDC from GDAAC via EMSnet dropped a bit on Aug 15 with the switch to BOP. Thruput is now under half of the requirement, and less than expected for an OC-3 circuit.

Other Testing:

Source → Dest	Medians of daily tests (kbps)				
	Best	Median	Worst	Requirement	Rating
JPL → NSIDC-SIDADS	5672	4026	3016	260	Excellent
LDAAC - NSIDC	4644	4495	3965		

Performance from JPL via EMSnet improved (from a median of 2.4 mbps) on Aug 15 with the BOP switchover, still very stable, and limited by the new NISN VCs.

Testing from LaRC via EMSnet restarted 29 August (after the BOP switchover). Performance is very steady and higher than before the BOP, previously the median was 3.2 mbps.